Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

University of Maine.

Maine Agricultural Experiment Station

ORONO

BULLETIN No. 171. NOVEMBER, 1909.

THE PINE-LEAF AND THE GREEN-WINGED CHERMES

A bulletin on Maine Chermes now in process of preparation is of technical character and will not be sent to the general mailing list of the Station. The two species discussed in this bulletin, however, are of economic interest in the State and for this reason the following popular account of them is prepared for immediate distribution in Maine. The bulletin on Maine Chermes will not be ready for distribution until next year.

MAINE
AGRICULTURAL EXPERIMENT STATION
ORONO, MAINE.

THE STATION COUNCIL

PRESIDENT GEORGE E. FELLOWS	*President*
DIRECTOR CHARLES D. WOODS	*Secretary*
JOHN A. ROBERTS, Norway	*Committee of Board of Trustees*
CHARLES L. JONES, Corinna	
SAMUEL W. GOULD, Skowhegan	
AUGUSTUS W. GILMAN, Foxcroft	*Commissioner of Agriculture*
EUGENE H. LIBBY, Auburn	*State Grange*
CHARLES S. POPE, Manchester	*State Pomological Society*
RUTILLUS ALDEN, Winthrop	*State Dairymen's Association*

AND THE HEADS AND ASSOCIATES OF STATION DEPARTMENTS

THE STATION STAFF.

ADMINISTRATION	CHARLES D. WOODS, Sc. D	*Director*
	HARRY M. WOODS, A. B.	*Asst. to the Director*
	BLANCHE F. POOLER	*Stenographer*
	RALPH K. JONES, B. S.	*Librarian*
	CHARLES J. DUNN	*Treasurer*
	GRACE M. COLBURN	*Bookkeeper*
BIOLOGY	RAYMOND PEARL, Ph. D	*Biologist*
	FRANK M. SURFACE, Ph. D.	*Associate*
	MAYNIE R. CURTIS, A. M	*Assistant*
	WALTER ANDERSON.	*Poultryman*
	LOTTIE E. McPHETERS.	*Computer*
CHEMISTRY	JAMES M. BARTLETT, M. S.	*Chemist*
	HERMAN H. HANSON, M. S.	*Associate*
	JOSEPH F. MERRILL, B. S.	*Assistant*
	ALBERT G.. DURGIN, M. S.	*Assistant*
ENTOMOLOGY	EDITH M. PATCH, B. S.	*Entomologist*
	OSKAR A. JOHANNSEN, Ph. D	*Associate*
	ALICE W. AVERILL	*Laboratory Assistant*
HORTICULTURE	WALTER W. BONNS, B. S.	*Associate*
PLANT PATHOLOGY	WARNER J. MORSE, M. S	*Pathologist*
	CHARLES E. LEWIS, Ph. D.	*Associate*
	JOHN SUMMERS	*Laboratory Assistant*
HIGHMOOR FARM	WELLINGTON SINCLAIR	*Superintendent*
ROYDEN L. HAMMOND		*Seed Analyst and Photographer*
HENRY A. MILLETT		*Meteorological Observer and Janitor*

D. OF D.
MAY 20 1910

S69
.E4

BULLETIN No. 171.

THE PINE-LEAF CHERMES
AND
THE GREEN-WINGED CHERMES.*

EDITH M. PATCH.

THE PINE-LEAF CHERMES (*Chermes pinifoliæ* Fitch).

On account of recent troubles, varying in nature and importance, of the white pine in Maine a close watch has been kept over the pine by people throughout the State, which has resulted in their becoming interested in many insects of the white pine heretofore attracting but little attention.

Conspicuous among such insects during the early summer of 1909 was a dark reddish-brown plant louse, "The Pine-leaf Chermes" shown in Fig. 43 in its characteristic position on the pine needles where it settles to lay its eggs. This Chermes appears upon the pine needle about the middle of June, and some years in conspicuous numbers.

The past summer (1909) hardly a pine in the vicinity of Orono could be found that was not abundantly infested with these winged forms and that the same was true in other parts of the State was shown by specimens submitted to the Station. One such report from Gilead June 25, accompanying specimens, read "Millions of the flies on white pine."

The eggs of this species are not expelled from the bodies of the females. The insects attach themselves firmly to the pine needles with their heads toward the base of the needle and die there with the eggs held in the abdomen which is like a little sac protected by the wing of the parent *Chermes*. Such a cluster contains about 100 eggs. These hatch in 8 or 10 days from the time the Chermes appear on the needle of the pine. The young settle about the new growth of the shoot and piercing the tender tissue with their beaks, suck the sap. Where the infestation is heavy this causes a yellowish and sickly appearance of the new growth which is sometimes thus considerably stunted. The young, though exceedingly minute, can be located because they produce a white flocculent waxy secretion which makes their presence discernable.*

---

* Papers from the Maine Agricultural Experiment Station; Entomology No. 37.

The Pine-leaf Chermes is one of those species of plant lice that have alternate "host plants," that is, they pass one stage of their life on one plant and the succeeding stage on another species of plant.

The winged Chermes that appear suddenly upon the needles of the pine in mid-June have not developed on the white pine but in a cone-like gall common on the Red Spruce and Black Spruce, see Fig. 44. This gall is an abnormally developed shoot, the unusual form of growth being stimulated in some way by the presence of the Chermes. The young Chermes can be found in these galls by opening the sections of the galls where little reddish brown objects will be seen,—the developing Chermes.

These galls though sometimes very abundant in Maine are likely to escape notice as they are so cone-like in appearance as to seem to the superficial glance a normal part of the spruce. They were observed by Packard as common in Maine and the plant louse forming them was named *abieticolens* in 1879, the fact that they were the same species Fitch recorded for the pine needle not being known at that time.†

---

* Another much smaller species of plant louse (*Chermes pinicorticis*) is frequently present on the trunk of the same tree in such numbers as sometimes to cover almost the entire trunk with a white down.

† This species develops in a cone-like gall on the black and red spruces (in which connection it was named *abieticolens* in 1879 by Thomas and subsequently merged by error with *abietis* in 1897), and migrates to the needles of the white pine (in which connection it had been previously named *pinifoliae* by Fitch in 1858, and merged by error with *pinicorticis* in 1869). This historical discussion with full reasons for resurrecting this doubly merged species under the original name of *pinifoliae,* which has been discarded for about 40 years, will be published presently in more technical form by the Maine Agricultural Experiment Station. For the purposes of this economic bulletin it is not necessary to include either detailed descriptions or discussion.

The full grown Chermes acquire wings about the middle of June when they leave the spruce galls and seek the white pine.

Remedial Measures. There would seem to be no practical method of combatting this insect in forest growth. With ornamental trees, however, the galls could be removed from the spruce previous to the emerging of the winged form. Also if the species proves constantly troublesome it might be desirable not to plant the white pine in the vicinity of black or red spruce and *vice versa.*

Spraying with whale-oil soap (1 pound to 2 gallons of water) would doubtless destroy the young on the white pine shoots, but it is doubtful that this would be usually worth while in Maine where Syrphus flies abound. The larvæ of these, little light colored maggots, have been found to feed industriously on the young Chermes. So numerous are these beneficial maggots at times in the midst of the white waxy secretion of the Chermes that they are sometimes mistaken by people submitting them for determination as the cause of the trouble.

THE GREEN-WINGED CHERMES (*Chermes abietis* Linn).

An entirely different sort of gall common in Maine on the White Spruce, and Norway Spruce, is caused by another species of Chermes which is here termed the "Green-winged Chermes" as the conspicuous and constant green tinge of the wings is a character which will readily serve to distinguish it from the "Pine-leaf Chermes" by those who would find a more technical comparison troublesome.

Fig. 45 shows 3 of these galls together with 6 cones, about natural size on a white spruce twig. It will be seen that these galls differ from those shown in Fig. 44 in not being cone-like and in not being characteristically terminal on the shoot. These *abietis* galls do not usually cause the death of the shoot on which they grow but they do cause deformed branches and frequently ruin a small tree for ornamental purposes. Such galls are very abundant on the Norway spruces on the University of Maine Campus. That they are troublesome on native spruce in this locality is shown by the fact that on a single white spruce 3 feet tall more than 990 of this season's galls were counted August 1, 1909. Where so numerous, these galls are much smaller than those shown in Fig. 45.

These galls begin to open about August 15 in Maine. The full grown pupæ walk out on the spruce needles, where they molt their pupal skins. The newly emerged winged insect is yellowish with distinctly green wings and even the wings of the aged specimens retain the green color.

Unlike the Pine-leaf Chermes, this Green-winged Chermes does not use alternate host plants. That is, it does not seek the pine or any different kind of tree to lay eggs on than that on which it produces the galls. Shortly after emerging from the gall it lays its eggs on the spruce and the young which hatch from them do not acquire wings but develop to a wingless form living solitary over winter on the twig. This is the form that lays eggs in the spring for the generation that causes the development of the gall which shelters them.

Remedial Measures. Spraying the trees in April with whale-oil soap solution (1 pound to 2 gallons of water) has been reported as effectual. (34th Report Mass. Agric. College). The practice of removing and burning the galls will serve to control this species sufficiently on ornamental trees. At Orono great numbers of the winged forms are caught in spiders' webs that are spun irregularly over the spruce twigs.

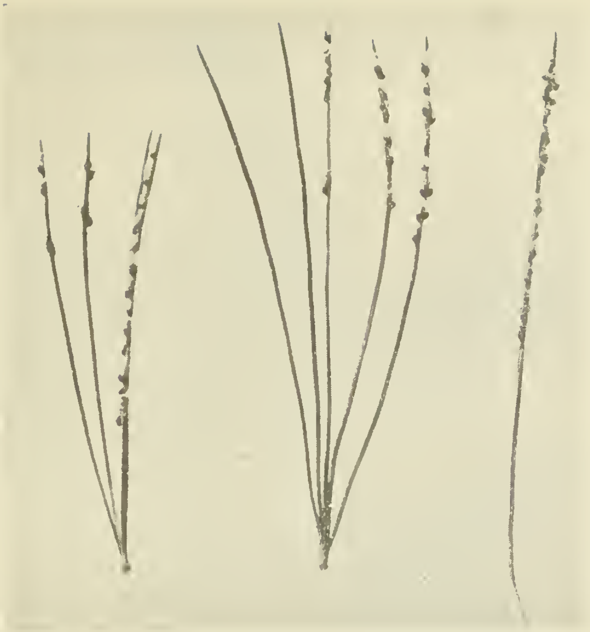

FIG. 43.—The Pine-Leaf Chermes. Migrants from the spruce-gall to the white pine.

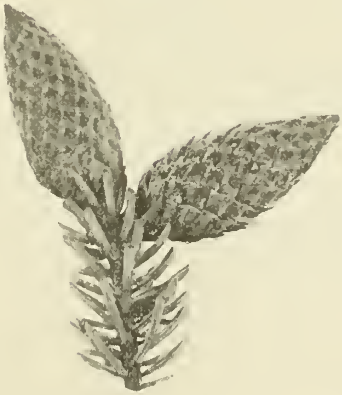

FIG. 44—Black spruce twig with two cone-like galls caused by the Pine-Leaf Chermes.

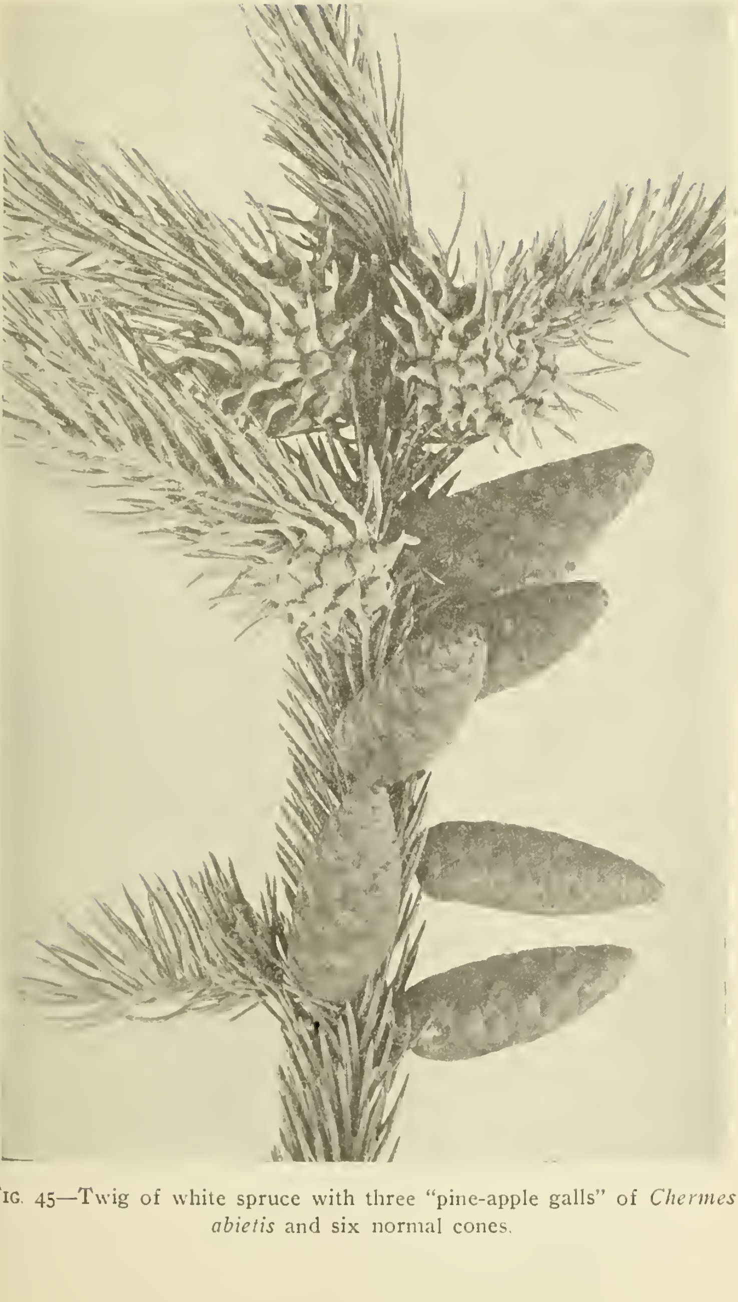

FIG. 45—Twig of white spruce with three "pine-apple galls" of *Chermes abietis* and six normal cones.

BULLETIN 170.

Bulletin 170 discussed from the technical standpoint two species of fungi that have, for the past two years, been under experimental observation by the plant pathologists in relation to apple diseases. The practical bearing of these fungi upon orcharding will be discussed in a bulletin to be issued early in 1910. For these reasons this bulletin (170) was printed in a limited edition and was sent only to the official mailing list, to libraries and to exchanges. Copies may be had on application to the Station.